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UTILITY PATENT APPLICATION TRANSMITTAL

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Attorney Docket No. 187627
First Named Inventor Mitrevics
Express Mail No. EL304644931US

APPLICATION ELEMENTS

1. ☒ Utility Transmittal Form
2. ☒ Specification (including claims and abstract) [Total Pages 16]
[Total Sheets 7]
3. ☒ Drawings
4. ☒ Combined Declaration and Power of Attorney [Total Pages 3]
 - a. ☒ Newly executed
 - b. ☐ Copy from prior application
[Note Box 5 below]
 - i. ☐ Deletion of Inventor(s) Signed statement attached deleting inventor(s) named in the prior application
5. ☐ Incorporation by Reference: The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.
6. ☐ Microfiche Computer Program
7. ☐ Nucleotide and/or Amino Acid Sequence Submission
 - a. ☐ Computer Readable Copy
 - b. ☐ Paper Copy
 - c. ☐ Statement verifying above copies

ACCOMPANYING APPLICATION PARTS

8. ☐ Assignment Papers (cover sheet and document(s))
9. ☐ Power of Attorney
10. ☐ English Translation Document (if applicable)
11. ☐ Information Disclosure Statement (IDS)
 - ☐ Form PTO-1449
 - ☐ Copies of References
12. ☐ Preliminary Amendment
13. ☒ Return Receipt Postcard (Should be specifically itemized)
14. ☒ Small Entity Statement(s)
 - ☒ Enclosed
 - ☐ Statement filed in prior application; status still proper and desired
15. ☐ Certified Copy of Priority Document(s)
16. ☐ Other:

17. If a CONTINUING APPLICATION, check appropriate box and supply the requisite information in (a) and (b) below:
- (a) ☐ Continuation ☐ Divisional ☐ Continuation-in-part of prior application Serial No. _____
Prior application information: Examiner _____; Group Art Unit: _____
- (b) Preliminary Amendment: Relate Back - 35 USC §120. The Commissioner is requested to amend the specification by inserting the following sentence before the first line:
"This is a ☐ continuation ☐ divisional of copending application(s)
☐ Serial No. _____, filed on _____
☐ International Application, filed on _____, and which designates the U.S."

APPLICATION FEES

BASIC FEE				\$760.00
CLAIMS	NUMBER FILED		NUMBER EXTRA	RATE
Total Claims	17	-20=		x \$18.00 \$
Independent Claims	5	-3=	2	x \$78.00 \$156.00
<input type="checkbox"/> Multiple Dependent Claims(s) if applicable				+\$260.00 \$
Total of above calculations =				\$916.00
Reduction by 50% for filing by small entity =				\$(458.00)
<input type="checkbox"/> Assignment fee if applicable				+\$40.00 \$
TOTAL =				\$458.00

UTILITY PATENT APPLICATION TRANSMITTAL

Attorney Docket No. 187627

19. ☐ Please charge my Deposit Account No. 12-1216 in the amount of \$.
20. ☒ A check in the amount of \$458.00 is enclosed.
21. The Commissioner is hereby authorized to credit overpayments or charge any additional fees of the following types to Deposit Account No. 12-1216:
- ☒ Fees required under 37 CFR §1.16.
 - ☐ Fees required under 37 CFR §1.17.
22. ☐ The Commissioner is hereby generally authorized under 37 CFR §1.136(a)(3) to treat any future reply in this or any related application filed pursuant to 37 CFR §1.53 requiring an extension of time as incorporating a request therefor, and the Commissioner is hereby specifically authorized to charge Deposit Account No. 12-1216 for any fee that may be due in connection with such a request for an extension of time.

23. CORRESPONDENCE ADDRESS

James B. Muskal, Registration No. 22,797
 Leydig, Voit & Mayer, Ltd.
 Two Prudential Plaza, Suite 4900
 180 North Stetson
 Chicago, Illinois 60601-6780
 Telephone: (312) 616-5600
 Facsimile: (312) 616-5700

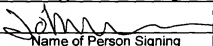
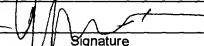
Name	James B. Muskal
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Signature	
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Date	December 21, 1999
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Certificate of Mailing Under 37 CFR §1.10

I hereby certify that this Utility Patent Application Transmittal and all accompanying documents are being deposited with the United States Postal Service "Express Mail Post Office To Addressee" Service under 37 CFR §1.10 on the date indicated below and is addressed to: Assistant Commissioner for Patents, Box Patent Application, Washington, D.C. 20231.

		December 21, 1999
Name of Person Signing	Signature	Date

UTILITY (Rev. 8/30/1999)

PATENT

Attorney Docket No. 187627

Applicant or Patentee: Al Mitrevics

Serial or Patent No.:

Filed or Issued:

For: GLAZING SYSTEM FOR HOLLOW METAL WALLS

**VERIFIED STATEMENT (DECLARATION)
CLAIMING SMALL ENTITY STATUS
37 C.F.R. §§ 1.9(f) & 1.27(b) - INDEPENDENT INVENTOR**

As a below-named inventor, I hereby declare that I qualify as an independent inventor as defined in 37 C.F.R. § 1.9(c), for purposes of paying reduced fees under Sections 41(a) and (b) of Title 35, United States Code, to the Patent and Trademark Office with regard to the invention entitled:

GLAZING SYSTEM FOR HOLLOW METAL WALLS

described in:

- ☒ The specification filed herewith.
☐ Application Serial No. , filed .
☐ Patent No. , issued .

Others Having Rights In The Invention

I have not assigned, granted, conveyed, or licensed, and I am not under any obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who could not be classified as an independent inventor under 37 C.F.R. § 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business concern under 37 C.F.R. § 1.9(d) or a nonprofit organization under 37 C.F.R. § 1.9(e).

Each person, concern, or organization to which I have assigned, granted, conveyed, or licensed or am under an obligation under contract or law to assign, grant, convey, or license any rights in the invention is listed below:

- ☒ no such person, concern, or organization.
☐ persons, concerns, or organizations listed below. (NOTE: Separate verified statements are required from each named person, concern or organization having rights to the invention averring to his/her/its status as a small entity.)

Name:

Address:

- ☐ Individual ☐ Small Business Concern ☐ Nonprofit Organization

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of

paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 C.F.R. § 1.28(b)).

I hereby declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

Name of Inventor: Al Mitrevics



Signature of Inventor

12/14/99

Date

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Separator Sheet



AAA

Application Text

appears behind this sheet in the following order:

Amendment

(English Language Only)

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SPECIFICATION

To All Whom It May Concern:

Be it known that I, **Al Mitrevics**, a citizen of the United States residing at 243 East Scott Avenue, Gilbert, AZ 85234, respectively, have invented a certain new and useful **GLAZING SYSTEM FOR HOLLOW METAL WALLS**, of which the following is a specification.

GLAZING SYSTEM FOR HOLLOW METAL WALLS

This application is based on disclosure document no. 446,666, filed September 2, 1998

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Field Of The Invention

A glazing system for hollow metal walls and more particularly a glazing channel to secure panels into openings in hollow metal walls

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Background Of The Invention

Storefronts today are typically comprised of a wall made of glass or decorative panels securely mounted in a frame that is divided by mullions to form an array of panels secured to the frame and mullions or between the mullions. Sliding or swinging doors are also typically included as part of the storefront. There are two basic types of storefront systems. Both systems came into popular use shortly after World War I. A system that is manufactured of formed steel is called pressed steel or more commonly now known as hollow metal. The other storefront system is manufactured of extruded aluminum sections and is known as an aluminum storefront. Hollow metal construction is employed in the fabrication of the exterior of buildings as well as the interior. Extruded aluminum is used almost exclusively on the exterior.

The principle benefit that derives from employing the hollow metal system is that its components are welded together and is therefore much stronger than the extruded aluminum, which is frictionally snapped together or assembled with metal fasteners. A major downside of hollow metal systems resides in their appearance, which usually presents an array of multiple lines and fasteners. The main benefit of the aluminum system is that the extruded aluminum lends itself to the creation of a much more aesthetic storefront characterized by smooth clean lines free of any apparent fasteners. Typical of such extruded window mullion and curtain wall structures is that of F.A. Schilling in his U.S. Patent No. 2,866,527 ('527) issued December 30, 1958 where an extruded metal U-shaped mullion has spaced apart side

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walls defining an elongated opening. The side walls have on their inner face a saw-toothed rib and an extruded metal cap cooperates with the saw-tooth rib to close the opening. A snap together extruded metal storefront construction is shown and described in S.E. Hubbard U.S. Patent No. 3,081,849 ('849) which includes a metal framing element that consists of stock lengths of matching, interchangeable, extruded moldings designed for field construction to create complete exterior facades, interior facings and partitions. A principal feature of the snap together construction is the creation for appearance sake and protection against vandalism of a storefront so designed as to be assembled without the use of exposed screws or other visible fasteners. A more recent curtain wall structure is that of Parinas et al. as shown and described in U.S. Patent No. 5,253,459 ('459) issued October 19, 1993. Parinas et al. focuses on the provision of an improved four corner joint construction to create a weather tight seal. The use of extruded aluminum allows for a snap together construction where heads of screws employed to secure glass panels in place are hidden by a snap on cap. The foregoing '527, '849, and '459 patents, are all examples of extruded aluminum construction techniques where novelty flows from a basic need to design structures that must take into account the limited number of cross-section configurations that can be formed by one extrusion. In each case a requirement to replace a panel in the wall comes with it an attendant risk of damaging in a highly visible manner the detailed appearance of the mullions and mid-frame structures of storefronts made with the extruded metal components.

Storefronts and curtain walls fabricated with hollow metal frames and hollow metal mullions welded into unified structures typically employ a common method for securing glass or opaque panels into the frame/mullion combination. This common method involves forming a rabbet on an edge of the hollow metal frame or mullion. A rabbet being defined as a cut or a groove along or near the edge of the hollow metal frame or mullion that allows another piece to fit into it to form a joint. In the case of a storefront, for example, the rabbets present in a portion of the frame and associated mullions create a groove about a perimeter of an opening in the storefront. Into this opening a pane of glass or an opaque panel may be inserted. The depth of the rabbet, that is the groove, is made deep enough to accommodate the

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thickness of the glass pane or panel and a bead, that is a narrow projecting strip of molding. The bead is provided with a plurality of openings therethrough. Screws are then inserted through the openings and engage corresponding openings in the rabbet of the hollow metal frame or mullion. The beads may be made of glass or metal. The principle drawback of this approach involves esthetics, namely the overall form and beauty of the storefront. It is often said, "beauty is in the eye of the beholder". There is a school of thought that suggests form and function when combined in elegantly simple lines is inherently more attractive and esthetically appealing than a multitude of lines that define the form of parts that make up the whole. The verity of this school of thought is everywhere present in a consumer driven economy. One need go no further than simple household appliances that have internal mechanisms that are encased in attractive housings. It is believed by many that the highest level of creative design is to be found in structural environments where the form of the outward appearance simultaneously provides by the very nature of the physical form an essential structural function. It is suggested that the desirability of extruded metal storefront structures is principally tied to the esthetics visually presented by these structures. Clearly, hollow metal storefronts are stronger but visually not as attractive as extruded metal because hollow metal storefronts present a large number of lines that come into existence when the hollow metal rabbets and beads with exposed fastener screw heads are employed to mount glass panes or panels in the storefront. The invention to be described hereinafter visually reduces the total number of visible lines in the storefront employing the invention while simultaneously securing glass panes or panels into the storefront with a minimum of parts while providing for quick and easy dismantling in the event the glass or panels need to be replaced. None of these just mentioned desirable attributes can be found in the prior art just reviewed.

Summary Of The Invention

Simply stated the invention provides a hollow metal storefront or curtain wall structure that utilizes a single simple glazing bead to secure glass panes

or panels in the structure while simultaneously allowing the quick removal of the same.

More specifically, the invention in its broadest and most elegant sense is directed to a bent metal glazing bead that has one elongated leg that has at least one portion thereof of a u-shaped cross-section where one side of the u-shape is short and the other side is long and includes a bridge portion. The elongated u-shaped cross-section and bridge portion form a bead. The elongated u-shaped leg with its long side and bridge portion provide a smooth continuous surface.

The elongated u-shaped cross-section leg is configured to cooperate in a mating fashion with a portion of a support structure to sandwich a panel on the support structure between the short side of the elongated leg and long side bridge portion and an opposing surface portion of the support structure to thereby glaze the panel in place and simultaneously visually present a smooth continuous surface of the glazing bead to mask a junction of the panel with the support structure.

In a highly preferred embodiment, the invention is directed to a glazing bead for use in combination with a hollow metal wall having unitary welded frame at its perimeter and may have at least one mullion welded thereto to provide at least two openings in the wall into which openings at least two panels are glazed into the mullion and secured against the frame by means of a glazing bead utilizing the invention. The invention also intended for use where there is simply a single panel surrounded by a frame. The glazing bead in this embodiment takes the form of a bent metal U-shape that has a pair of spaced apart elongated hollow rectangular cross-section legs integrally connected by a bridge element to form a U-shaped channel between the elongated legs, while providing an opposing smooth external continuous surface comprised of a portion of each of the elongated hollow legs and the bridge element. The U-shaped channel of the glazing channel cooperates in a mating fashion with a portion of the mullion to sandwich panels on either side of the mullion between the elongated hollow legs and a portion of the mullion. With the glazing channel in place on the mullion panels on either side of the mullion are simultaneously glazed in place. The resulting structure presents a smooth

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continuous external surface of the glazing channel to cover a junction of the panels with the mullion.

It is therefore a primary object of the invention to provide a glazing bead for use in hollow metal walls to simultaneously secure panels on either side of a mullion to the mullion or to secure a single panel to a frame.

Another object of the invention is to provide glazing channel that present a smooth continuous external surface to cover a junction of wall panels with a mullion or frame while simultaneously locating the panels in place between the glazing channel and the mullion.

Yet another object of the invention is to provide an easily removable glazing channel for use with hollow metal mullions or frames of storefront construction.

Other object and advantages of the invention will become more apparent from the following detailed description when taken in conjunction with the accompanying drawings.

Brief Description Of The Drawings

The description set forth above, as well as other objects, features and advantages of the present invention, will be more fully appreciated by referring to the detailed description and the drawings that follow. The description is of the presently preferred but, nonetheless, illustrative embodiment in accordance with the present invention, when taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a schematic elevation front view of a prior art hollow metal storefront.

FIG. 1a is a rearview of the prior art storefront of FIG. 1.

FIG. 2 is a sectional view taken along line 2-2 in FIG. 1.

FIG. 3 is a sectional view taken along line 3-3 in FIG. 1.

FIG. 4 is a sectional view taken along line 4-4 in FIG. 1.

FIG. 4a is a perspective showing of a prior art bead glazing technique for securing panels to a mullion

FIG. 5 is a sectional view taken along 5-5 in FIG. 1.

FIG. 6 is a schematic representation of a prior art front elevation of a storefront.

FIG. 6a is a rearview of FIG. 6.

FIG. 7 is a sectional view taken along line 7-7 in FIG. 6.

5 FIG. 8 is a sectional view taken along line 8-8 in FIG. 6.

FIG. 9 is a sectional view taken along line 9-9 in FIG. 6.

FIG. 10 is a sectional view taken along line 10-10 in FIG. 6.

FIG. 11 is a front elevation view of a storefront that embodies the invention.

FIG. 11a is a rear elevation view taken along line 12-12 in FIG. 11.

10 FIG. 12 is a sectional view taken along line 12-12 in FIG. 11.

FIG. 13 and 13a when taken together show a sectional view taken along line 13-13 in FIG. 11 and shows one manner in which a frame maybe formed to receive a panel or pane of glass.

FIG. 14 is a sectional view taken along line 14-14 in FIG. 11 and illustrates a
15 preferred embodiment of the invention.

FIG. 14a is a cross-sectional view of a glazing channel that embodies the invention.

FIG. 14b is an enlarged partial section of the manner in which a glazing
channel that embodies the invention glazes in place panels on either side of a
20 mullion.

FIG. 14c is a perspective section of mullion and panels held in place by
glazing channel that embodies the invention.

FIG. 15 is a section taken along lien 15-15 in FIG. 11.

FIG. 15a is a perspective view of a glazing element shown in cross-section in
25 FIG. 15.

FIG. 16 is a cross-section of a mullion, panels and another type of glazing
bead that embodies the invention.

FIG. 16 is a perspective view of the glazing bead shown in FIG. 16.

FIG. 17 is a cross-section of a mullion, panels and yet another type of glazing
30 bead that embodies the invention.

FIG. 17a is a perspective view of the glazing bead shown in FIG. 17.

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While the invention will be described in connection with certain preferred embodiments, there is no intent to limit it to those embodiments. On the contrary, the intent is to cover all alternatives, modifications and equivalents as included within the spirit and scope of the invention as defined by the appended claims.

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Detailed Description Of The Preferred Embodiment

Reference is now made to FIGS. 1, 1a and 2-5 which illustrate a typical prior art storefront 10. The storefront in this example is shown with windows, i.e., glass panes or panels 11, 12, 13 and 14, as well as a door 16. The door 16 is only shown schematically and it is to be understood that it is mounted to a side door panel 17 by an inference hinge partially shown in FIG. 2. The door 16 when in a closed position interacts with side doorframe 18 in a wholly conventional manner. The storefront 10 also includes top frame 19, side frame 20, bottom frame 21 and vertical mullion 26 and horizontal mullion 27. These just described frame and mullions are manufactured of formed steel, i.e., repressed steel or more commonly now known as hollow metal. Each of these just recited structural elements of the storefront 10 are welded together, by welds not shown, to create a structurally integrated whole.

Attention is now directed specifically to Figures 2-5 where as can be seen in the section shown in FIG. 2 the side doorframe 17 manufactured from formed metal includes rabbets 22, 23 on the door side of the frame. Figure 3 shows the cross-sectional detail of hollow metal side doorframe 18 which is manufactured to include rabbets 24, 25 and 28, 29 to create a generally cruciform cross-section. The glass pane or panel 13 is shown glazed in place by means of a glass bead 31 which is secured as shown to the side doorframe 18 by means of screw fastener 32.

Turning now to FIG. 4 and FIG. 4a, note that FIG. 4a is a perspective view of FIG. 4 rotated through ninety degrees (90°). The vertical hollow metal mullion 26 has a similar cruciform cross-section in which rabbets 33, 34 include glass beads 36, 37 to sandwich and hold in place glass panes or panels 13 and 14. The glass beads 36, 37 are secured to the hollow metal mullion 26 by means of a plurality of screw fasteners 32a, 32b. When glass beading is employed to hold the glass panels or panes in place by screw fasteners the heads of the fasteners generally extend above

the surface of the glass beads and are clearly visible to the naked eye. Because the scale of the drawing of FIG. 1 is so small the heads of the screw fastener are not shown. Side frame 20 in a fashion similar to side doorframe 18 shows glass pane or panel 14 held in place by glass bead 38 in rabbet 39.

5 The reader of this specification is invited to scan FIG. 1 and take note of the visually busy nature of the store front brought about by the great multiplicity of horizontal and vertical lines produced by the edges that define the rabbets and the glass beads.

10 The visual business of the exterior and interior of the storefront 10 of FIGS. 1 and 1a are ameliorated as shown in prior art example of FIGS. 6, 6a and 7-10 by the removal of most of the rabbets on the interior side of hollow metal frames. In FIGS. 8-10 arrows 50, 51, 52 and 53 point to the regions of the hollow metal frames 17a, 18a, 20a and mullion 26a on the storefront interior where the rabbets have been removed. In the exterior doorframe sections 17a, 18a arrows 53, 54, FIGS. 7 and 8
15 are also shown removed. This action of removing the rabbet region of the hollow metal structure reduces the visual business of interior appearance of the storefront as seen in FIG. 6a, but does little to relieve the visual business blight of the storefront as depicted in FIG. 6.

20 Attention is now directed to the series of Figures beginning with FIGS. 11 and 11a through FIG. 15 which depict a hollow metal storefront 10' which is esthetically enhanced by the incorporation of the subject invention to eliminate the visual business that encumbered prior art storefronts. In the description that follows reference numerals that designate similar structural components or details described in earlier figures will employ the same reference numeral that will be modified by
25 the inclusion a prime above and adjacent the numeral.

30 Attention is now directed to FIGS. 11 and 11a which depict a preferred embodiment of the invention. FIG. 11 depicts an exterior storefront 10' and in FIG. 11a shows an interior of storefront 10'. It should be immediately apparent that the multiplicity of vertical and horizontal lines visible on the storefront 10' exterior, FIG. 11 and interior FIG. 11a have vanished. Construction of the highly esthetic appearance of the exterior and interior of the storefront 10' will now be set forth in

conjunction with an explanation of the details of the invention as seen with particular reference to FIGS. 14, 14a, 14b and 14c.

Before focusing on the invention per se it will be seen that in FIG. 12 the rabbet in the side doorframe 17' has been removed as was explained with respect to

5 FIG. 7. In FIGS. 15 and 15a, the simplest and most elegant embodiment of the invention is shown for securing a glass pane or panel to a side frame 20'. In FIG. 13, the side doorframe 18' is shown with an integral pocket 30 into which window or panel 13' maybe slid into the pocket 30 as shown in FIG. 13a. Where appropriate, a frame or mullion may be manufactured with a pocket of the nature just described.

10 Attention is now directed to FIG. 15 and 15a where there is shown an alternative approach for securing a window or panel to a frame or one side of a mullion. In FIGS. 15, 15a there is shown a glazing bead 60 that embodies the invention. FIG. 15a shows in a perspective view the glazing bead 60. As is readily apparent when FIG. 15a is studied, the glazing bead 60 has an elongated hollow rectangular cross-

15 section leg 61 and an integrally formed bridge element 62 which functions to bridge the elongated hollow leg 61 to the side frame 20'. The elongated hollow leg 61 and bridge element 62 of glazing bead 60 create an opposing external, smooth continuous surface 70 (see FIG. 11) comprised of a portion of the elongated hollow leg 61 and the bridge element 62 (see FIGS. 15, 15a). When FIG. 15 is examined it

20 will be seen that the elongated hollow leg 61 is configured to cooperate in a mating fashion with a portion of the unreferenced rabbet formed in side frame 20' to thereby sandwich the panel 14' on the side frame 20' between the elongated hollow leg 61 and an unreferenced opposing surface portion of the rabbet formed in the side frame 20' to thereby glaze the panel in place and simultaneously visually present the

25 smooth continuous surface 70 of the glazing bead 60 to mask a junction of the panel with the side frame 20'. The rivet 47' which may be of the "pop-rivet" type is shown in place in FIG. 15 in an opening 45' (FIG. 15a) to mechanically secure the bridge element 62 to the side frame 20'. In order to remove the glazing bead 60 one need only drill out the pop-rivet 47 by inserting a drill bit not shown into the center of the

30 pop-rivet 47. Removal of the glazing bead 60 in the manner just described leaves the glazing bead 60 free of any visual damage.

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Attention is now directed to FIGS. 14, 14a, 14b and 14c where a detailed explanation of the invention will unfold. FIG. 14 depicts a section view of vertical mullion 26' taken along line 14-14 in FIG. 11. Arrows 51', 52' point to regions of the hollow metal vertical mullion 26' where the rabbets have been removed as was described earlier with reference to FIG. 9. Window pane/panels 13', 14' are shown positioned in rabbets 33', 34'. Immediately beneath FIG. 14 in FIG. 14a the glazing channel 40 embodying the invention is shown in cross-section. The glazing channel 40 includes a pair of spaced apart elongated hollow rectangular cross-section legs 41, 42 which are interconnected by a bridge element 43. This just described structure creates a U-shaped channel 44 between the elongated legs 41, 42. The elongated nature of the legs 41, 42 may be better appreciated by a study of FIG. 14c. FIG. 14c is simply a perspective view of a rotated view of FIG. 14b which shows the glazing channel 40 as it is intended to be used. Returning to FIG. 14a, the bridge element 43 is provided with an opening 45. The opening 45 may be included during the fabrication of the glazing channel 40 or added just prior to placing it over the tongue shaped end 46 of the mullion 26' formed by the presence of rabbets 33', 34'. A rivet fastener 47 is shown adjacent opening 45 in bridge element 43. In FIG. 14 there is shown in axial alignment with opening 45 and rivet 47 an opening 48 in the tongue shaped end 46. The opening 48 is normally made after the glazing channel 40 embodying the invention is fitted over the tongue 45. In FIG. 14c one can easily see that the invention provides a smooth continuous surface 49 comprised of a portion of each of the elongated hollow legs 41, 42 and the bridge element 43. In FIGS. 14b and 14c the U-shaped channel 44 of the glazing channel 40 is shown cooperating in a mating fashion with the tongue shaped end portion 46 of the mullion 26' to sandwich panels 13', 14' on either side of the mullion 26' between the elongated hollow legs 41, 42 and surface portions 48, 48a of the mullion 26'. (See FIG. 14b). When FIG. 14c is examined it will be noted the glazing channel 40 embodying the invention when employed as described above will simultaneously glaze both sides of the mullion 26' and thereby present an external appearance of the smooth continuous surface 49.

Reference is now made to FIG. 16 which illustrates another species of glazing bead in use that embodies the invention. In FIG. 16 a mullion 64 is shown with panels 65, 66 held in place with glazing bead 67 secured as shown to the mullion 64 by an unreferenced rivet.

- 5 FIGS. 17 and 17a in a similar fashion depict still yet another species of glazing bead 68 secured as shown to a mullion 69.

 With specific reference to FIGS. 16, 16a it will be noted that the glazing bead has a pair of elongated legs 70, 71. Each leg has at least one portion 72, 73 thereof having u-shaped cross-section where one side 74, 75 of the u-shape is short and the
10 other side is long and includes a bridge portion 76 that establishes a smooth continuous surface.

 A review of FIGS. 17 and 17a reveals that the glazing bead 68 differs from the glazing bead of FIGS. 16 and 16a in that the short sides 74', 75' of the glazing bead 68 includes structural return elements 77, 78.

What Is Claimed Is:

1. A bent metal glazing bead having at least one elongated leg that has at least one portion thereof of a u-shaped cross-section where one side of the u-shape is short and the other side is long and includes a bridge portion, the elongated u-shaped cross-section and bridge portion forming a bead, the elongated u-shaped leg with its long side and bridge portion providing a smooth continuous surface,

the elongated u-shaped cross-section leg configured to cooperate in a mating fashion with a portion of a support structure to sandwich a panel on the support structure between the short side of the elongated leg and long side bridge portion and an opposing surface portion of the support structure to thereby glaze the panel in place and simultaneously visually present a smooth continuous surface of the glazing bead to mask a junction of the panel with the support structure.

2. The bent metal glazing bead of Claim 1 wherein the support structure is a frame portion of an opening in a wall.

3. The bent metal glazing bead of Claim 2 which further includes at least one mechanical means that cooperates with the bridge portion of the long side of the u-shaped cross-section and a portion of the frame to thereby secure the glazing bead to the frame.

4. The bent metal glazing bead of Claim 2 wherein the elongated leg is dimensioned to matingly engage a rabbet on the frame that has positioned within the rabbet a panel to be glazed in place.

5. A bent metal glazing bead having a pair of spaced elongated legs having a U-shaped channel therebetween, each leg having portions thereof that have a U-shaped cross-section, one side of each u-shape section being short and the other side being interconnected to form a bridge element joining the spaced apart elongated legs so as to provide a continuous surface spanning both elongated legs and the u-shaped channel;

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6. The bent metal glazing bead of claim 5 which further includes at least one mechanical means that cooperates with the bridge element and a portion of a mullion matingly fitted into the U-shaped channel between the elongated legs to thereby secure the glazing channel to the mullion.

8. A bent metal glazing bead having at least one elongated hollow rectangular cross-section leg and an integrally formed bridge element to form the bead, the elongated hollow leg and bridge element providing an opposing external, smooth continuous surface comprised of a portion of the elongated hollow leg and the bridge element.

9. The bent metal glazing bead of Claim 8 wherein the support structure is a frame portion of an opening in a wall.

10. The bent metal glazing bead of Claim 9 which further includes at least one mechanical means that cooperates with the bridge element and a portion of the frame to thereby secure the glazing bead to the frame.

11. The bent metal glazing bead of Claim 9 wherein the elongated hollow leg of rectangular cross-section is dimensioned to matingly engage a rabbet on the frame that has positioned within the rabbet a panel to be glazed in place.

12. A bent metal glazing bead having a pair of spaced apart elongated hollow rectangular cross-section legs interconnected by a bridge element to form a U-shaped channel between the elongated legs, while providing an opposing external smooth continuous surface comprised of a portion of each of the elongated hollow legs and the bridge element,

the U-shaped channel of the glazing bead configured to cooperate in a mating fashion with a portion of a mullion to sandwich panels on either side of the mullion between the elongated hollow legs and an opposing surface portion of the mullion to thereby simultaneously glaze both sides of the mullion and thereby present the smooth continuous surface of the glazing channel to mask a junction of the panels with the mullion

13. The bent metal glazing bead of Claim 12 which further includes at least one mechanical means that cooperates with the bridge element and a portion of a mullion matingly fitted into the U-shaped channel between the elongated legs to thereby secure the glazing channel to the mullion.

14. The bent metal glazing bead of Claim 2 wherein the elongated legs of rectangular cross-section are dimensioned to matingly engage rabbets on either side of the mullion that have positioned within each rabbet a panel to be glazed in place.

15. A glazing bead for use in combination with a hollow metal wall having a unitary welded frame at its perimeter and at least one mullion welded

thereto to provide at least two openings in the wall into which openings at least two panels are glazed onto the mullion and secured against the frame by means of a glazing bead, the glazing bead comprising:

a bent metal U-shaped glazing channel having a pair of spaced apart elongated hollow rectangular cross-section legs interconnected by a bridge element to form a U-shaped channel between the elongated legs, while providing an opposing external smooth continuous surface comprised of a portion of each of the elongated hollow legs and the bridge element,

the U-shaped channel of the glazing channel cooperating in a mating fashion with a portion of the mullion to sandwich panels on either side of the mullion between the elongated hollow legs and a surface portion of the mullion to thereby simultaneously glaze both sides of the mullion and thereby present the smooth continuous surface of the glazing channel to cover a junction of the panels with the mullion.

16. The glazing bead and hollow metal wall of Claim 15 which further includes at least one fastener to securely connect the bridge element to the mullion.

17. The glazing bead and hollow metal wall of Claim 15 wherein the mullion is provided with rabbets on either side of the mullion which cooperate with an edge of each panel when the panels are sandwiched between the elongated hollow legs of the glazing channel and the mullion.

ABSTRACT OF THE DISCLOSURE

A bent metal glazing bead that has at least one elongated that has at least one portion thereof a U-shaped cross-section where one side of the U-shape is short and the other side is long and includes a bridge portion. The elongated U-shaped cross-section and bridge portion form a bead. The elongated U-shaped leg with its long side and bridge portion provide a smooth continuous surface. of a portion of the elongated hollow leg and the bridge element.

The elongated U-shaped cross-section leg is configured to cooperate in a mating fashion with a portion of a support structure to sandwich a panel on the support structure between the short side of the elongated leg and long side bridge portion and an opposing surface portion of the support structure to thereby glaze the panel in place and simultaneously visually present a smooth continuous surface of the glazing bead to mask a junction of the panel with support structure.

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Separator Sheer



Miscellaneous Material Includes:

1. Drawings
2. Oath or Declaration
3. Foreign language specification
4. Sequence listing
5. Computer listing
6. Appendices

Fig. 1
(Prior Art)

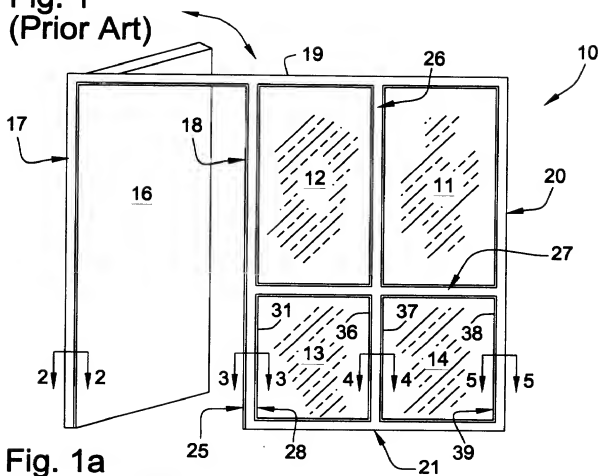


Fig. 1a
(Prior Art)

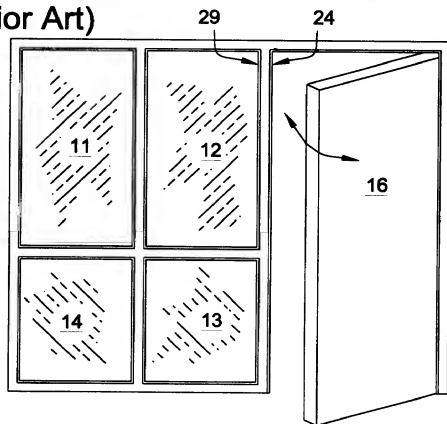


Fig. 2
(Prior Art)

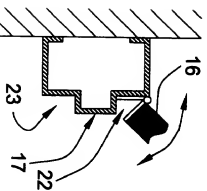


Fig. 3
(Prior Art)

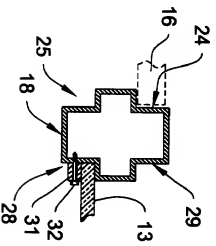


Fig. 4
(Prior Art)

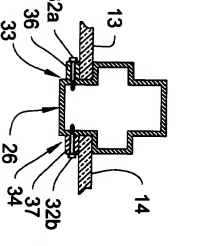


Fig. 5
(Prior Art)

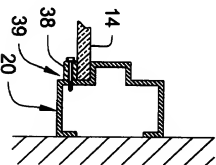


Fig. 4a

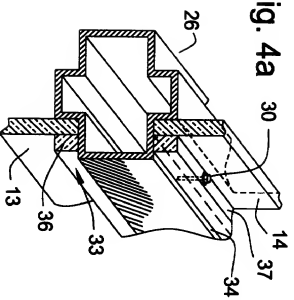


Fig. 6
(Prior Art)

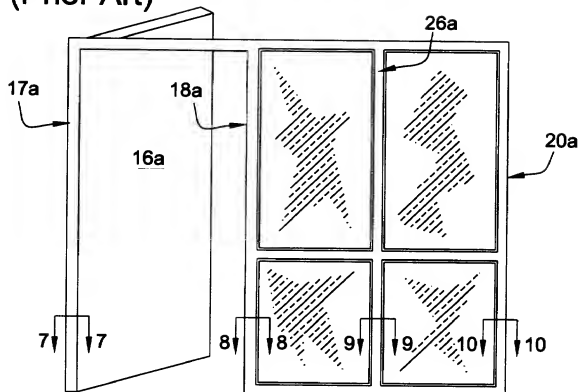


Fig. 6a
(Prior Art)

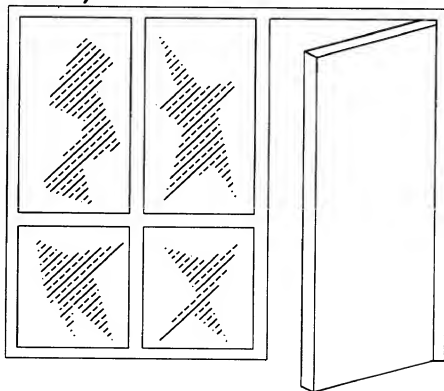


Fig. 7
(Prior Art)

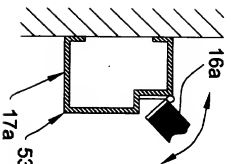


Fig. 8
(Prior Art)

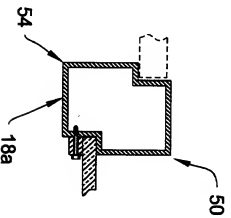


Fig. 9
(Prior Art)

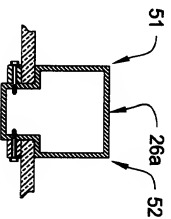


Fig. 10
(Prior Art)

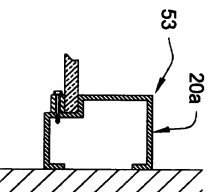


Fig. 11

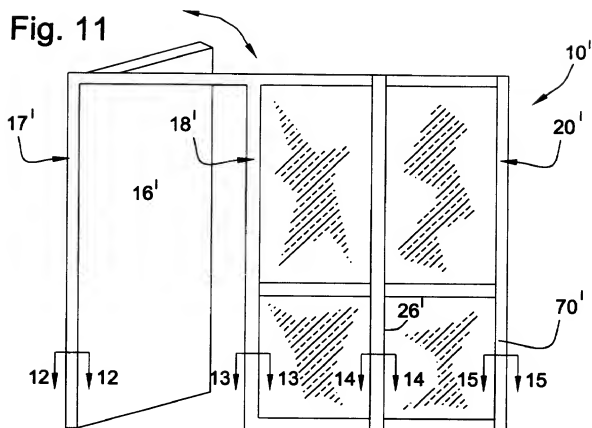


Fig. 11a

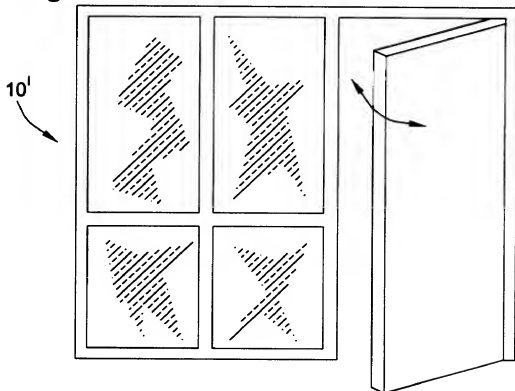


Fig. 12

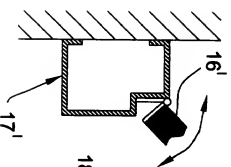


Fig. 13

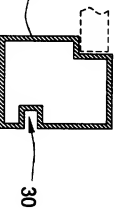


Fig. 14

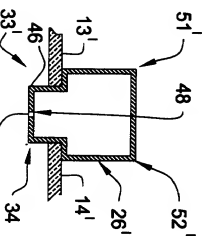


Fig. 15

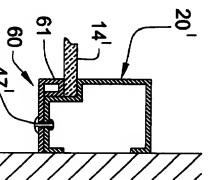


Fig. 14a

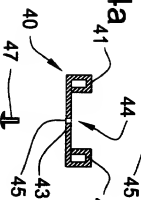


Fig. 15a

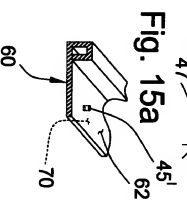


Fig. 13a

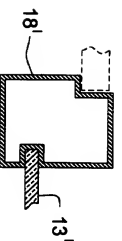


Fig. 14b

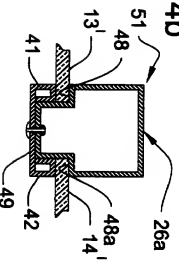


Fig. 16

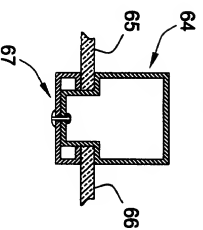


Fig. 17

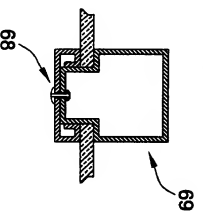


Fig. 14c

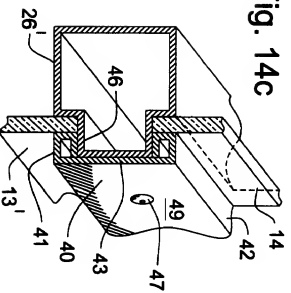


Fig. 16a

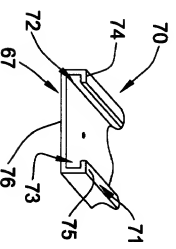
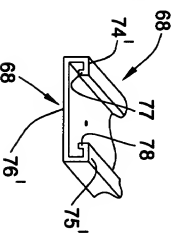


Fig. 17a



COMBINED DECLARATION AND POWER OF ATTORNEY

As below named inventor, I hereby declare that

This declaration is of the following type:

- ☒ original ☐ design ☐ supplemental
☐ national stage of PCT
☐ divisional ☐ continuation ☐ continuation-in-part

My residence, post office address, and citizenship are as stated below next to my name. I believe I am the original, first, and sole inventor (*if only one name is listed below*) or an original, first, and joint inventor (*if plural names are listed below*) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

GLAZING SYSTEM FOR HOLLOW METAL WALLS

the specification of which:

- ☒ is attached hereto.
☐ was filed on _____ as Serial No. _____ and was amended on _____ (*if applicable*).
☐ was filed by Express Mail No. _____ as Serial No. not known yet, and was amended on _____ (*if applicable*).
☐ was described and claimed in PCT International Application No. _____ filed on _____ and as amended under PCT Article 19 on _____ (*if any*).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claim(s), as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, § 1.56.

I hereby claim foreign priority benefits under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed.

COUNTRY	APPLICATION	DATE OF FILING (day,month,year)	PRIORITY CLAIMED UNDER 35 USC 119	
			YES	NO
			YES	NO
			YES	NO

I hereby claim the benefit pursuant to Title 35, United States Code, § 119(e) of the following United States provisional application(s):

PRIOR U.S. PROVISIONAL APPLICATIONS CLAIMING THE BENEFIT UNDER 35 USC 119(e)	
APPLICATION NO.	DATE OF FILING

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application.

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 USC 120					
U.S. APPLICATIONS			Status <i>(check one)</i>		
U.S. APPLICATIONS	U.S. FILING DATE	PATENTED	PENDING	ABANDONED	
1. 0 /					
2. 0 /					
3. 0 /					
PCT APPLICATIONS DESIGNATING THE U.S.			Status <i>(check one)</i>		
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NOS. ASSIGNED (if any)	PATENTED	PENDING	ABANDONED
4.					
5.					
6.					

DETAILS OF FOREIGN APPLICATIONS FROM WHICH PRIORITY CLAIMED UNDER 35 USC 119 FOR ABOVE LISTED U.S./PCT APPLICATIONS				
ABOVE APPLN. NO.	COUNTRY	APPLICATION NO.	DATE OF FILING (day,month,yr)	DATE OF ISSUE (day,month,yr)
1.				
2.				
3.				
4.				
5.				
6.				

As a named inventor, I hereby appoint the following attorneys to prosecute this application and transact all business in the Patent and Trademark Office connected therewith.

Berton Scott Sheppard, Reg. 20922
 James B. Muskal, Reg. 22797
 Dennis R. Schlemmer, Reg. 24703
 Gordon R. Coons, Reg. 20821
 John E. Rosenquist, Reg. 26356
 John W. Kozak, Reg. 25117
 Charles S. Oslakovic, Reg. 27583
 Mark E. Phelps, Reg. 28461
 H. Michael Hartmann, Reg. 28423
 Bruce M. Gagala, Reg. 28844
 Charles H. Mottier, Reg. 30874
 John Kilyk, Jr., Reg. 30763
 Robert F. Green, Reg. 27555
 John B. Conklin, Reg. 30369
 James D. Zalewa, Reg. 27848
 John M. Belz, Reg. 30359
 Brett A. Hesterberg, Reg. 31837
 Jeffrey A. Wyand, Reg. 29458

Paul J. Korniczky, Reg. 32849
 Pamela J. Ruschau, Reg. 34242
 Steven P. Petersen, 32927
 John M. Augustyn, Reg. 33589
 Christopher I. Griffith, Reg. 33392
 Wesley O. Mueller, Reg. 33976
 Jeremy M. Jay, Reg. 33587
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 Mark Joy, Reg. 35562
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 Y. Kurt Chang, Reg. 41397
 Gregory C. Bays, Reg. 40505
 Carol Larcher, Reg. 35243
 Steven H. Sklar, Reg. 42154
 M. Daniel Hefner, Reg. 41826

Thomas A. Belush, Reg. 37090
 Kenneth P. Spina, Reg. 43927
 Gary R. Jarosik, Reg. 35906
 Song Zhu, Reg. 44420
 Andrew J. Heinisch, Reg. 43666
 Jeffery J. Makeever, Reg. 37390
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 Richard A. Wulff, Reg. 42238
 Jamison E. Lynch, Reg. 41168
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 Robert M. Gould, Reg. 43642
 Leonard S. Smith, Reg. 43139
 Kevin L. Wingate, Reg. 38662
 David J. Schodin, Reg. 41294
 Paul L. Ahern, Reg. 17020
 Theodore W. Anderson, Reg. 17035
 Noel I. Smith, Reg. 18698

I further direct that correspondence concerning this application be directed to LEYDIG, VOIT & MAYER, LTD., Two Prudential Plaza, Suite 4900, 180 North Stetson, Chicago, Illinois 60601-6780, Telephone (312) 616-5600.

I hereby declare that all statements made herein of my own knowledge are true, that all statements made on information and belief are believed to be true, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor: Al Mitrevics

Inventor's signature

Date

12/14/99

Country of Citizenship: U.S.A.

Residence: 243 East Scott Avenue
 Gilbert, AZ 85234

Post Office Address: 243 East Scott Avenue
 Gilbert, AZ 85234

Full name of second joint inventor, if any: None

Inventor's signature

Date

Country of Citizenship:

Residence:

Post Office Address: